

CLAIMS

- 1 1. A system for exhibiting Cherenkov radiation comprising:
2 a beam of traveling charged particles; and
3 a photonic crystal structure that receives said beam of charged particles, said
4 charged particles move in said photonic crystal structure so that Cherenkov radiation is
5 produced at all velocities without requiring resonances in the effective material constants
6 of said photonic crystal structure.
- 1 2. The system of claim 1, wherein said beam of charged particles comprise of an electron
2 beam.
- 1 3. The system of claim 2, wherein said photonic crystal structure comprises of output
2 waveguides where said Cherenkov radiation outputs said photonic crystal structure.
- 1 4. The system of claim 3, wherein said Cherenkov radiation is received by one or more
2 photomultipliers.
- 1 5. The system of claim 4, wherein said dispersion of charges particles are absorbed by an
2 absorber.
- 1 6. The system of claim 3, wherein said electron beam is formed by a cathode-anode
2 arrangement.
- 1 7. The system of claim 6, wherein said Cherenkov radiation is tunable by frequency.
- 1 8. A method of exhibiting Cherenkov radiation comprising:
2 providing a beam of charged particles; and

3 providing a photonic crystal structure that receives said beam of charged particles,
4 said charged particles moving in said photonic crystal structure so that Cherenkov
5 radiation is produced at all velocities without requiring resonances in the effective
6 material constants of said photonic crystal structure.

1 9. The method of claim 8, wherein said charged particles comprise of an electron beam.

1 10. The method of claim 9, wherein said photonic crystal structure comprises of output
2 waveguides where said Cherenkov radiation outputs said photonic crystal structure.

1 11. The method of claim 10, wherein said Cherenkov radiation is received by one or
2 more photomultipliers.

1 12. The method of claim 11, wherein said dispersion of charges particles are absorbed by
2 an absorber.

1 13. The method of claim 10, wherein said electron beam is formed by a cathode-anode
2 arrangement.

1 14. The method of claim 13, wherein said Cherenkov radiation is tunable by frequency.

1 15. The system of claim 2, wherein said photonic crystal structure comprises of no^{ts}
2 output waveguides.

1 16. The system of claim 2, wherein said beam of traveling charged particles travels in an
2 all-air channel of said photonic crystal structure.

1 17. The system of claim 7, wherein said frequency is tunable by scaling the photonic
2 crystal structure.

1 18. The method of claim 9, wherein said photonic crystal structure comprises no output
2 waveguides.

1 19. The method of claim 9, wherein said beam of traveling charged particles travels in an
2 all-air channel of said photonic crystal structure.

1 20. The method of claim 14, wherein said frequency is tunable by scaling the photonic
2 crystal structure.